# **WEST Search History**

Hide Items Restore Clear Cancel

DATE: Tuesday, June 28, 2005

Hide?	Set Nam	e Query	Hit Count
	DB=PC	GPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD; PLUR=YES; OP=ADJ	
	L10	L9 and (hydrogen peroxide)	17
	L9	L8 and (ammonium hydroxide)	19
	L8	L7 and ultrasonic	49
	L7	L6 and 13	140
	L6	L2 and 11	148
	L5	L2 same 11	0
	L4	L3 same 12	3558
	L3	treating or removing or cleaning or decontaminating	3060975
	L2	photomasks	35846
	L1	(134/1 or 134/1.3 or 134/2 or 134/3 or 134/25.4 or 134/26 or 134/29).ccls.	9668

END OF SEARCH HISTORY

# **Hit List**

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## Search Results - Record(s) 11 through 17 of 17 returned.

11. Document ID: US 6681781 B2

L10: Entry 11 of 17

File: USPT

Jan 27, 2004

US-PAT-NO: 6681781

DOCUMENT-IDENTIFIER: US 6681781 B2

\*\* See image for <u>Certificate of Correction</u> \*\*

TITLE: Methods for <u>cleaning</u> microelectronic substrates using ultradilute <u>cleaning</u>

liquids

DATE-ISSUED: January 27, 2004

INVENTOR-INFORMATION:

NAME CITY STATE ZIP CODE COUNTRY

Puri; Suraj Los Altos CA Medeiros, Jr.; Joseph Santa Clara CA Becker; David Scott Excelsior MN Narayanswami; Natraj Eden Prairie MN

US-CL-CURRENT: <u>134/1.3</u>; <u>134/1</u>, <u>134/2</u>, <u>134/21</u>, <u>134/25.4</u>, <u>134/32</u>, <u>134/36</u>, <u>134/42</u>,

134/902

#### ABSTRACT:

A method of <u>cleaning</u> a surface of an article using <u>cleaning</u> liquids in combination with acoustic energy. Preferably, an ultradilute concentration of a <u>cleaning</u> enhancement substance, such as ammonia gas, is dissolved in a liquid solvent, such as filtered deionized water, to form a <u>cleaning</u> liquid. The <u>cleaning</u> liquid is caused to contact the surface to be cleaned. Acoustic energy is applied to the liquid during such contact. Optionally, the surface to be cleaned can be oxidized, e.g., by ozonated water, prior to <u>cleaning</u>.

12 Claims, 3 Drawing figures Exemplary Claim Number: 1 Number of Drawing Sheets: 3

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Full Title Citation Front F	eview Classification Date Refe	rence	Claims Kuuc Draw De
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12. Document ID: US 6616773 B1

L10: Entry 12 of 17

File: USPT

Sep 9, 2003

US-PAT-NO: 6616773

DOCUMENT-IDENTIFIER: US 6616773 B1

TITLE: Substrate treatment method

DATE-ISSUED: September 9, 2003

#### INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Kuzumoto; Masaki	Tokyo			JP ·
Noda; Seiji	Tokyo			JP
Oya; Izumi	Tokyo			JP
Miyamoto; Makoto	Tokyo			JP
Horibe; Hideo	Tokyo			JP
Kataoka; Tatsuo	Shizuoka			JP
Oishi; Tetsuji	Shizuoka			JP

US-CL-CURRENT:  $\underline{134/26}$ ;  $\underline{134/1.3}$ ,  $\underline{134/2}$ ,  $\underline{134/3}$ ,  $\underline{134/31}$ ,  $\underline{134/37}$ ,  $\underline{216/57}$ ,  $\underline{216/83}$ ,

<u>216/94</u>

### ABSTRACT:

A substrate treatment assembly for <u>treating</u> a work object on a surface of a substrate by supplying to the work object a wet ozone-containing gas wetted with a treatment solution includes a substrate heating device for maintaining a substrate at a temperature higher than room temperature, a wetting device for producing a wet ozone-containing gas by wetting an ozone-containing gas with a treatment solution, a supply device for supplying the wet ozone-containing gas to a work object on a surface of the substrate, a gas conduit connecting the wetting device to the supply device, and a heating device for heating the wet ozone-containing gas to a temperature approximately equal to or greater than the temperature of the substrate.

12 Claims, 36 Drawing figures Exemplary Claim Number: 1 Number of Drawing Sheets: 19

Full Title Citation Front	Review Classification	Date Reference	Claims KWWC	Drawa De

13. Document ID: US 6582525 B2

L10: Entry 13 of 17 File: USPT Jun 24, 2003

US-PAT-NO: 6582525

DOCUMENT-IDENTIFIER: US 6582525 B2

TITLE: Methods for processing a workpiece using steam and ozone

DATE-ISSUED: June 24, 2003

INVENTOR-INFORMATION:

NAME CITY STATE ZIP CODE COUNTRY

Bergman; Eric J.

Kalispell

 $\mathbf{MT}$ 

59901

US-CL-CURRENT:  $\underline{134/2}$ ;  $\underline{134/19}$ ,  $\underline{134/25.4}$ ,  $\underline{134/26}$ ,  $\underline{134/28}$ ,  $\underline{134/3}$ ,  $\underline{134/30}$ ,  $\underline{134/31}$ ,  $\underline{134/33}$ ,  $\underline{134/35}$ ,  $\underline{134/36}$ ,  $\underline{134/37}$ ,  $\underline{134/41}$ ,  $\underline{134/902}$ ,  $\underline{257/E21.228}$ ,  $\underline{257/E21.229}$ 

#### ABSTRACT:

In a method for processing a workpiece to remove material from a first surface of the workpiece, steam is introduced onto the first surface under conditions so that at least some of the steam condenses and forms a liquid boundary layer on the first surface. The condensing steam helps to maintain the first surface of the workpiece at an elevated temperature. Ozone is provided around the workpiece under conditions where the ozone diffuses through the boundary layer and reacts with the material on the first surface. The temperature of the first surface is controlled to maintain condensation of the steam.

41 Claims, 7 Drawing figures Exemplary Claim Number: 1 Number of Drawing Sheets: 7

Full Title Citation Front Review Classification Date Reference Citation Claims KMC Draw, De

# 14. Document ID: US 6497768 B2

L10: Entry 14 of 17

File: USPT

Dec 24, 2002

US-PAT-NO: 6497768

DOCUMENT-IDENTIFIER: US 6497768 B2

TITLE: Process for treating a workpiece with hydrofluoric acid and ozone

DATE-ISSUED: December 24, 2002

INVENTOR-INFORMATION:

NAME CITY STATE ZIP CODE COUNTRY

Bergman; Eric J. Kalispell MT

US-CL-CURRENT: <u>134/3</u>; <u>134/2</u>, <u>134/25.4</u>, <u>134/30</u>, <u>134/31</u>, <u>134/33</u>, <u>134/41</u>, <u>134/902</u>, <u>257/E21.228</u>, <u>257/E21.229</u>

#### ABSTRACT:

A workpiece or substrate is placed in a support in a reaction chamber. A heated process liquid is sprayed onto the substrate. The thickness of the layer of process liquid formed on the substrate is controlled, e.g., by spinning the substrate. Ozone is introduced into the reaction chamber by injection into the liquid or into the reaction chamber, while the temperature of the substrate is controlled, to chemically process the substrate. The substrate is then rinsed and dried.

28 Claims, 7 Drawing figures Exemplary Claim Number: 1 Number of Drawing Sheets: 7

# Full: Title: Citation Front Review: Classification Date Reference Claims KMC Draw De

## 15. Document ID: US 6045621 A

L10: Entry 15 of 17

File: USPT

Apr 4, 2000

US-PAT-NO: 6045621

DOCUMENT-IDENTIFIER: US 6045621 A

TITLE: Method for cleaning objects using a fluid charge

DATE-ISSUED: April 4, 2000

INVENTOR-INFORMATION:

NAME CITY STATE ZIP CODE COUNTRY

Puri; Suraj Los Altos CA Mohindra; Raj Los Altos Hills CA

US-CL-CURRENT: <u>134/2</u>; <u>134/10</u>, <u>134/11</u>, <u>134/25.4</u>, <u>134/25.5</u>, <u>134/26</u>, <u>134/30</u>, <u>134/34</u>, <u>134/36</u>, <u>134/902</u>, <u>134/95.1</u>, <u>134/95.2</u>

#### ABSTRACT:

A method for <u>cleaning</u> an object. The method (400) includes immersing (420) an object in a liquid comprising water, which can be ultra-clean. The object has a front face, a back face, and an edge. The method includes providing (450) a <u>cleaning</u> enhancement substance (e.g., trace amount of polar organic compound, surfactant, ammonia bearing compound) into the liquid. In one embodiment, the <u>cleaning</u> enhancement substance can form a liquid film, such as a monolayer overlying an upper surface or level of the liquid. The method also includes providing a substantially particle free environment (e.g., ultra-clean gas, ultra-clean non-reactive gas) adjacent to the front face and the back face of the object as the liquid including the <u>cleaning</u> enhancement substance is being removed.

18 Claims, 13 Drawing figures Exemplary Claim Number: 1 Number of Drawing Sheets: 9

## 16. Document ID: US 5505785 A

L10: Entry 16 of 17 File: USPT Apr 9, 1996

US-PAT-NO: 5505785

DOCUMENT-IDENTIFIER: US 5505785 A

TITLE: Method and apparatus for cleaning integrated circuit wafers

DATE-ISSUED: April 9, 1996

INVENTOR-INFORMATION:

NAME CITY STATE ZIP CODE COUNTRY

Ferrell; Gary W. Half Moon Bay CA 94019

US-CL-CURRENT: <u>134/1</u>; <u>134/201</u>, <u>257/E21.228</u>

#### ABSTRACT:

A method and apparatus for <u>removing</u> particle, metallic and organic contamination from the wafers used in fabricating integrated circuits is disclosed. In the preferred embodiment, the method comprises the step of placing the wafers to be processed in a vessel or container constructed of a very pure metal, and upon which a surface oxide will quickly form in air. The metal vessel or container is then filled with a <u>cleaning</u> solvent such as sulfuric acid, and are ultrasonically vibrated to remove the contamination. The <u>ultrasonic</u> vibration causes an acoustic streaming of the sulfuric acid, leading to a microflow of the solvent across the surface of the wafer at speeds on the order of several meters per second. This microflow provides for an quick and efficient <u>cleaning</u> of the wafer at reduced temperatures, thereby increasing the overall throughput of the planar fabrication process. The apparatus comprises a vessel or container constructed from a very pure metal, and containing an acidic <u>cleaning</u> solvent. The metal vessel or container is coupled to an <u>ultrasonic</u> vibrating device which ultrasonically vibrates the vessel or container, thereby cleaning the wafers.

21 Claims, 16 Drawing figures Exemplary Claim Number: 12 Number of Drawing Sheets: 6

Full Title Citation Front Review Clas	sification Date Reference	CI	airms KOMC Drawa De
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17. Document ID: US 4239661 A

L10: Entry 17 of 17 File: USPT Dec 16, 1980

US-PAT-NO: 4239661

DOCUMENT-IDENTIFIER: US 4239661 A

\*\* See image for <u>Certificate of Correction</u> \*\*

TITLE: Surface-treating agent adapted for intermediate products of a semiconductor

device

DATE-ISSUED: December 16, 1980

INVENTOR-INFORMATION:

NAME STATE CITY ZIP CODE COUNTRY Muraoka; Hisashi Yokohama JP Asano; Masafumi Yokosuka JP Ohashi; Taizo Kanagawa JΡ Shimazaki; Yuzo Tokyo JΡ

US-CL-CURRENT: <u>438/471</u>; <u>134/2</u>, <u>134/38</u>, <u>134/42</u>, <u>257/E21.228</u>, <u>430/326</u>, <u>430/331</u>, <u>438/329</u>, <u>438/745</u>, <u>438/754</u>, <u>510/175</u>, <u>510/372</u>, <u>510/373</u>, <u>510/421</u>, <u>510/434</u>, <u>510/504</u>

#### ABSTRACT:

A surface—treating agent formed of an aqueous solution containing 0.01 to 20% by weight of trialkyl(hydroxyalkyl) ammonium hydroxide. The treating agent is adapted to be used for the effective removal of organic and inorganic contaminants deposited on the surface of intermediate semiconductor products obtained in the respective steps of manufacturing a semiconductor device and the efficient etching of a metal layer used as wiring. Further, it can be used for the elimination of those portions of a positive working photoresist film coated on the surface of the intermediate semiconductor products which are and are not exposed to a light by controlling its concentration.

32 Claims, 7 Drawing figures Exemplary Claim Number: 1 Number of Drawing Sheets: 3

ull Title Citation Front Review Classification Date Reference	Claims KMC
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Term	Documents
HYDROGEN	1054376
HYDROGENS	23524
PEROXIDE	252762
PEROXIDES	60386
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(L9 AND (HYDROGEN PEROXIDE)).PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD.	17

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# Search Results - Record(s) 1 through 10 of 17 returned.

1. Document ID: US 20050133067 A1

L10: Entry 1 of 17

File: PGPB

Jun 23, 2005

PGPUB-DOCUMENT-NUMBER: 20050133067

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20050133067 A1

TITLE: Processing a workpiece using water, a base, and ozone

PUBLICATION-DATE: June 23, 2005

INVENTOR-INFORMATION:

NAME

CITY

STATE

COUNTRY

RULE-47

Bergman, Eric J.

Kalispell

ΜТ

US

US-CL-CURRENT: 134/26

## ABSTRACT:

Contaminants such as photoresist are quickly removed from a wafer having metal features, using water, ozone and a base such as ammonium hydroxide. Processing is performed at room temperature to avoid metal corrosion. Ozone is delivered into a stream of process liquid or into the process environment or chamber. Steam may alternatively be used. A layer of liquid or vapor forms on the wafer surface. The ozone moves through the liquid layer via diffusion, entrainment, jetting/spraying or bulk transfer, and chemically reacts with the photoresist, to remove it.

Full Title   Citation   Front   Review   Classification	Date	Reference	Sequences	Attachments	Claims KMC Draw	Ž

2. Document ID: US 20040221876 A1

L10: Entry 2 of 17

File: PGPB

Nov 11, 2004

PGPUB-DOCUMENT-NUMBER: 20040221876

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20040221876 A1

TITLE: Method of <u>removing</u> organic materials from substrates

PUBLICATION-DATE: November 11, 2004

INVENTOR-INFORMATION:

Record List Display Page 2 of 8

NAME CITY STATE COUNTRY RULE-47

Waleh, Ahmad Palo Alto CA US Levenson, Eric O. Los Altos CA US

US-CL-CURRENT: <u>134/30</u>; <u>134/1</u>, <u>134/19</u>, <u>134/2</u>, <u>134/26</u>, <u>134/37</u>, <u>134/38</u>, <u>257/E21.229</u>

#### ABSTRACT:

Water-free, gaseous sulfur trioxide is used as an agent to remove various organic coatings, films, layers and residues from the surface of a substrate when used in conjunction with certain other physical and chemical treatments applied at the appropriate time during the process.

Full Title Citation Front	Review Classification Date 1	Reference   Sequences   Attachm	erits   Claims   KWC   Draw De

3. Document ID: US 20040144399 A1

L10: Entry 3 of 17 File: PGPB Jul 29, 2004

PGPUB-DOCUMENT-NUMBER: 20040144399

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20040144399 A1

TITLE: Processing of semiconductor components with dense processing fluids and

<u>ultrasonic</u> energy

PUBLICATION-DATE: July 29, 2004

## INVENTOR-INFORMATION:

CITY	STATE	COUNTRY	RULE-47
Fogelsville	PA	US	
Macungie	PA	US	
Doylestown	PA	US	
Bethlehem	PA	US	
	Fogelsville Macungie Doylestown	Fogelsville PA Macungie PA Doylestown PA	Fogelsville PA US Macungie PA US Doylestown PA US

US-CL-CURRENT: <u>134/1</u>; <u>134/1.3</u>, <u>134/11</u>, <u>134/198</u>, <u>134/34</u>, <u>134/35</u>, <u>134/37</u>

#### ABSTRACT:

Method for processing an article with a dense processing fluid in a processing chamber while applying <u>ultrasonic</u> energy during processing. The dense fluid may be generated in a separate pressurization vessel and transferred to the processing chamber, or alternatively may be generated directly in the processing chamber. A processing agent may be added to the pressurization vessel, to the processing chamber, or to the dense fluid during transfer from the pressurization vessel to the processing chamber. The <u>ultrasonic</u> energy may be generated continuously at a constant frequency or at variable frequencies. Alternatively, the <u>ultrasonic</u> energy may be generated intermittently.

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4. Document ID: US 20040055621 A1

L10: Entry 4 of 17

File: PGPB

Mar 25, 2004

PGPUB-DOCUMENT-NUMBER: 20040055621

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20040055621 A1

TITLE: Processing of semiconductor components with dense processing fluids and

ultrasonic energy

PUBLICATION-DATE: March 25, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
McDermott, Wayne Thomas	Fogelsville	PA	US	
Subawalla, Hoshang	Macungie	PA	US	
Johnson, Andrew David	Doylestown	PA	US	
Schwarz, Alexander	Bethlehem	PA	US	

US-CL-CURRENT: 134/1.3; 134/184, 134/26, 134/34, 134/95.1

#### ABSTRACT:

Method for processing an article with a dense processing fluid in a processing chamber while applying <u>ultrasonic</u> energy during processing. The dense fluid may be generated in a separate pressurization vessel and transferred to the processing chamber, or alternatively may be generated directly in the processing chamber. A processing agent may be added to the pressurization vessel, to the processing chamber, or to the dense fluid during transfer from the pressurization vessel to the processing chamber. The <u>ultrasonic</u> energy may be generated continuously at a constant frequency or at variable frequencies. Alternatively, the <u>ultrasonic</u> energy may be generated intermittently.

•	Full Title Citation	Front Review Classification Date Reference Sequences Attachments Claims KWIC Draw Do
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5. Document ID: US 20030205240 A1

L10: Entry 5 of 17

File: PGPB

Nov 6, 2003

PGPUB-DOCUMENT-NUMBER: 20030205240

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20030205240 A1

TITLE: Apparatus for treating a workpiece with steam and ozone

PUBLICATION-DATE: November 6, 2003

INVENTOR-INFORMATION:

NAME CITY STATE COUNTRY RULE-47

Record List Display Page 4 of 8

Bergman, Eric J.

Kalispell

MT

US

US-CL-CURRENT: <u>134/3</u>; <u>257/E21.228</u>, <u>257/E21.229</u>, <u>257/E23.054</u>

ABSTRACT:

In a method for processing a workpiece to remove material from a first surface of the workpiece, steam is introduced onto the first surface under conditions so that at least some of the steam condenses and forms a liquid boundary layer on the first surface. The condensing steam helps to maintain the first surface of the workpiece at an elevated temperature. Ozone is provided around the workpiece under conditions where the ozone diffuses through the boundary layer and reacts with the material on the first surface. The temperature of the first surface is controlled to maintain condensation of the steam.

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Full Title Citation Front Review Classification	the standard and the st
- :	T Attachments   Claims   KWC   Draw De

6. Document ID: US 20020050279 A1

L10: Entry 6 of 17

File: PGPB

May 2, 2002

PGPUB-DOCUMENT-NUMBER: 20020050279

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020050279 A1

TITLE: Process and apparatus for treating a workpiece with hydrofluoric acid and

ozone

PUBLICATION-DATE: May 2, 2002

INVENTOR-INFORMATION:

NAME

CITY

STATE COUNTRY

RULE-47

Bergman, Eric J.

Kalispell

MT

US

US-CL-CURRENT: <u>134/3</u>; <u>134/19</u>, <u>134/2</u>, <u>134/26</u>, <u>134/28</u>, <u>134/30</u>, <u>134/31</u>, <u>134/32</u>, <u>134/33</u>, <u>134/34</u>, <u>134/35</u>, <u>134/41</u>, <u>257/E21.228</u> , <u>257/E21.229</u>

ABSTRACT:

A workpiece or substrate is placed in a support in a reaction chamber. A heated process liquid is sprayed onto the substrate. The thickness of the layer of process liquid formed on the substrate is controlled, e.g., by spinning the substrate. Ozone is introduced into the reaction chamber by injection into the liquid or into the reaction chamber, while the temperature of the substrate is controlled, to chemically process the substrate. The substrate is then rinsed and dried.

Full Title Citation Front Review Classification Date Reference Sequences Atlachments Claims K	KMMC   Draws De

7. Document ID: US 20020020436 A1

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L10: Entry 7 of 17 File: PGPB Feb 21, 2002

PGPUB-DOCUMENT-NUMBER: 20020020436

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020020436 A1

TITLE: Process and apparatus for treating a workpiece with steam and ozone

PUBLICATION-DATE: February 21, 2002

INVENTOR-INFORMATION:

NAME CITY STATE COUNTRY RULE-47

Bergman, Eric J. Kalispell MT US

US-CL-CURRENT: <u>134/30</u>; <u>134/19</u>, <u>134/2</u>, <u>134/26</u>, <u>134/28</u>, <u>134/3</u>, <u>134/31</u>, <u>134/35</u>, <u>134/36</u>, <u>134/37</u>, <u>134/41</u>, <u>134/42</u>, <u>257/E21.228</u>, <u>257/E21.229</u>

#### ABSTRACT:

In a method for processing a workpiece to remove material from a first surface of the workpiece, steam is introduced onto the first surface under conditions so that at least some of the steam condenses and forms a liquid boundary layer on the first surface. The condensing steam helps to maintain the first surface of the workpiece at an elevated temperature. Ozone is provided around the workpiece under conditions where the ozone diffuses through the boundary layer and reacts with the material on the first surface. The temperature of the first surface is controlled to maintain condensation of the steam.

Full Title Citation Front Review Classification Date Reference Sequences Attachments Claims	COMC Drawn De

8. Document ID: US 20020011253 A1

L10: Entry 8 of 17 File: PGPB Jan 31, 2002

PGPUB-DOCUMENT-NUMBER: 20020011253

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020011253 A1

TITLE: METHODS FOR CLEANING MICROELECTRONIC SUBSTRATES USING ULTRADILUTE CLEANING

LIQUIDS

PUBLICATION-DATE: January 31, 2002

INVENTOR-INFORMATION:

NAME CITY STATE COUNTRY RULE-47 Puri, Suraj Los Altos CA US Medeiros, Joseph JR. Santa Clara US CA Becker, David Scott Excelsior MN US Narayanswami, Natraj Eden Prairie US

US-CL-CURRENT:  $\underline{134/1}$ ;  $\underline{134/1.3}$ ,  $\underline{134/2}$ ,  $\underline{134/21}$ ,  $\underline{134/25.4}$ ,  $\underline{134/32}$ ,  $\underline{134/36}$ ,  $\underline{134/42}$ ,

134/902

Record List Display

#### ABSTRACT:

A method of <u>cleaning</u> a surface of an article using <u>cleaning</u> liquids in combination with acoustic energy. Preferably, an ultradilute concentration of a <u>cleaning</u> enhancement substance, such as ammonia gas, is dissolved in a liquid solvent, such as filtered deionized water, to form a <u>cleaning</u> liquid. The <u>cleaning</u> liquid is caused to contact the surface to be cleaned. Acoustic energy is applied to the liquid during such contact. Optionally, the surface to be cleaned can be oxidized, e.g., by ozonated water, prior to cleaning.

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | Kont | Draw, De

9. Document ID: US 6869487 B1

L10: Entry 9 of 17

File: USPT

Mar 22, 2005

US-PAT-NO: 6869487

DOCUMENT-IDENTIFIER: US 6869487 B1

TITLE: Process and apparatus for treating a workpiece such as a semiconductor wafer

DATE-ISSUED: March 22, 2005

INVENTOR-INFORMATION:

NAME CITY STATE ZIP CODE COUNTRY

Bergman; Eric J. Kalispell MT

US-CL-CURRENT:  $\underline{134/3}$ ;  $\underline{134/102.1}$ ,  $\underline{134/102.2}$ ,  $\underline{134/108}$ ,  $\underline{134/111}$ ,  $\underline{134/19}$ ,  $\underline{134/25.4}$ ,  $\underline{134/26}$ ,  $\underline{134/30}$ ,  $\underline{134/31}$ ,  $\underline{134/33}$ ,  $\underline{134/902}$ 

## ABSTRACT:

A novel chemistry, system and application technique reduces contamination of semiconductor wafers and similar substrates and enhances and expedites processing. A stream of liquid chemical is applied to the workpiece surface. Ozone is delivered either into the liquid process stream or into the process environment. The ozone is preferably generated by a high capacity ozone generator. The chemical stream is provided in the form of a liquid or vapor. A boundary layer liquid or vapor forms on the workpiece surface. The thickness of the boundary layer is controlled. The chemical stream may include ammonium hydroxide for simultaneous particle and organic removal, another chemical to raise the pH of the solution, or other chemical additives designed to accomplish one or more specific cleaning steps.

25 Claims, 7 Drawing figures Exemplary Claim Number: 1 Number of Drawing Sheets: 7

Full Title Citation Front Review Classification Date Reference Citation Claims KMC Draw De

Record List Display Page 7 of 8

10. Document ID: US 6841008 B1

L10: Entry 10 of 17 File: USPT Jan 11, 2005

US-PAT-NO: 6841008

DOCUMENT-IDENTIFIER: US 6841008 B1

TITLE: Method for <u>cleaning</u> plasma etch chamber structures

DATE-ISSUED: January 11, 2005

INVENTOR-INFORMATION:

NAME CITY STATE ZIP CODE COUNTRY

Branco; Walter G. San Jose CA Qiao; Jianmiu Fremont CA

US-CL-CURRENT: <u>134/26</u>; <u>134/1.1</u>, <u>134/30</u>, <u>438/905</u>

#### ABSTRACT:

A method for <u>cleaning</u> a plasma reactor clamber part (100) may include dipping the chamber part in a solvent (102) that may dissolve a material that has been redistributed on the chamber part by a reactive plasma. A chamber part may then be rinsed (104), ultrasonically cleaned (106) in a <u>ultrasonic cleaning</u> liquid, and then rinsed again with a liquid that may evaporate at a lower temperature than an <u>ultrasonic cleaning</u> liquid (108). A chamber part may then be blown dry (110) and baked (112). In addition, or alternatively, a method may also include plasma <u>cleaning</u> a chamber part (202).

12 Claims, 5 Drawing figures Exemplary Claim Number: 1 Number of Drawing Sheets: 3

ं <b>F</b> ull ं ा	itle Citation Front Review Classification Date Reference	Claims (10)	MC Draw D
Clear	Generate Collection Print Fwd Refs Bkwd Refs	Generate	OACS
	Term	Documents	
	HYDROGEN	1054376	
	HYDROGENS	23524	
	PEROXIDE	252762	
	PEROXIDES	60386	
	(9 AND (HYDROGEN ADJ PEROXIDE)).PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD.	17	,
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